LUNES 12 - S. J106

LUNES 19 - TERCER PARCIAL
J205

MÉTODO: CUANDO TODOS LOS TÉRMINOS
DE LA EDEnDP TIENEN EL
MISMO ORDEN.

Método de Variables Separables.

« General, de prueba y error ».

$$\frac{\partial^2 z(x,y)}{\partial x^2} + 5\frac{\partial z(x,y)}{\partial y} = 0$$

H_0:

$$z(x,y) = F(x)\cdot G(y)$$

$$\frac{\partial z}{\partial x} = F'(x)\cdot G(y) \qquad \frac{\partial z}{\partial y} = F(x)\,G'(y)$$

$$\frac{\partial^2 z}{\partial x^2} = F''(x)\cdot G(y)$$

$$F''(x)G(y) + 5\,F(x)G'(y) = 0$$

$$F''(x)G(y) = -5\,F(x)G'(y)$$

$$\frac{F''(x)\,\cancel{G(y)}}{F(x)\,\cancel{G(y)}} = -5\,\frac{\cancel{F(x)}\,G'(y)}{\cancel{F(x)}\,G(y)}$$

$$\frac{F''(x)}{F(x)} = -5\,\frac{G'(y)}{G(y)}$$

$$\boxed{\frac{F''(x)}{5F(x)} = -\frac{G'(y)}{G(y)}}$$

$$-\frac{F''(x)}{5F(x)} = \frac{G'(y)}{G(y)}$$

$$-\frac{F''(x)}{F(x)} = \frac{5G'(y)}{G(y)}$$

la Hipótesis es Válida

H_1: $z(x,y) = F(x) + G(y)$ ✗

H_2: $z(x,y) = \dfrac{F(x)}{G(y)} \qquad z(x,y) = \dfrac{G(y)}{F(x)}$

H_3: $z(x,y) = F(x)^y \qquad G(y)^x$

H_4 = $z(x,y) = F(x)\,h(G(y))$

$$\frac{F''(x)}{5F(x)} = -\frac{G'(y)}{G(y)}$$

$$\frac{F''(x)}{5F(x)} = \alpha \qquad -\frac{G'(y)}{G(y)} = \alpha$$

$\alpha = 0$ $\qquad \alpha > 0 \qquad \alpha < 0$

$$\frac{F''(x)}{5F(x)} = 0 \qquad F(x) \neq 0 \qquad F''(x) = 0$$

$$F'(x) = k_1 \qquad \boxed{F(x) = k_1 x + k_2}$$

$$-\frac{G'(y)}{G(y)} = 0 \qquad G(y) \neq 0 \qquad G'(y) = 0 \qquad \boxed{G(y) = C_1}$$

$$Z(x,y) = (k_1 x + k_2)\, C_1$$

$$\boxed{Z(x,y) = k_{10} x + k_{20}}$$

$\alpha > 0 \qquad \alpha = k^2 \quad \forall k \neq 0 \in \mathbb{R}$

$$\frac{F''(x)}{5F(x)} = k^2 \qquad F''(x) = 5k^2 F(x)$$

$$F''(x) - 5k^2 F(x) = 0$$

$m^2 - 5k^2 = 0$

EDO(2) L cc H.

$(m - \sqrt{5}k)(m + \sqrt{5}k) = 0$

$m_1 = \sqrt{5}k \qquad m_2 = -\sqrt{5}k$

$$\boxed{F(x) = C_1 e^{\sqrt{5}kx} + C_2 e^{-\sqrt{5}kx}}$$

$$-\frac{G'(y)}{G(y)} = k^2$$

$G'(y) = -k^2 G(y)$ EDO(1) L cc H

$$G'(y) + k^2 G(y) = 0$$

$$\boxed{G(y) = K_1 e^{-k^2 y}}$$

$$Z(x,y) = \left(C_1 e^{\sqrt{5}kx} + C_2 e^{-\sqrt{5}kx}\right)\left(K_1 e^{-k^2 y}\right)$$

$$= C_{10} e^{\sqrt{5}kx} e^{-k^2 y} + C_{20} e^{-\sqrt{5}kx} e^{-k^2 y}$$

$$\boxed{Z(x,y) = C_{10} e^{(\sqrt{5}kx - k^2 y)} + C_{20} e^{-(\sqrt{5}kx + k^2 y)}}$$

$\alpha < 0 \quad \alpha = -k^2 \quad \forall k \neq 0 \in \mathbb{R}$

$$\frac{F''(x)}{5F(x)} = -k^2 \qquad F''(x) = -5k^2 F(x)$$

$F''(x) + 5k^2 F(x) = 0$ EDO(2) L cc H.

$m^2 + 5k^2 = 0 \qquad m_1 = -\sqrt{5}ki$

$m_2 = \sqrt{5}ki$

$$\boxed{F(x) = C_1 \cos(\sqrt{5}kx) + C_2 \operatorname{sen}(\sqrt{5}kx)}$$

$$-\frac{G'(y)}{G(y)} = -k^2 \qquad G(y) = K_1 e^{k^2 y}$$

$$\boxed{Z(x,y) = C_0 e^{k^2 y} \cos(\sqrt{5}kx) + C_0 e^{k^2 y} \operatorname{sen}(\sqrt{5}kx)}$$